

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>5</sup> : B26F 3/00	A1	(11) International Publication Number: WO 93/10950 (43) International Publication Date: 10 June 1993 (10.06.93)
--	----	--

(21) International Application Number: PCT/DK92/00355

(22) International Filing Date: 27 November 1992 (27.11.92)

(30) Priority data:  
9103505-5 27 November 1991 (27.11.91) SE

(71) Applicant (for all designated States except US): LUMETECH A/S [DK/DK]; Strandvejen 50, DK-2900 Hellerup (DK).

(72) Inventor; and

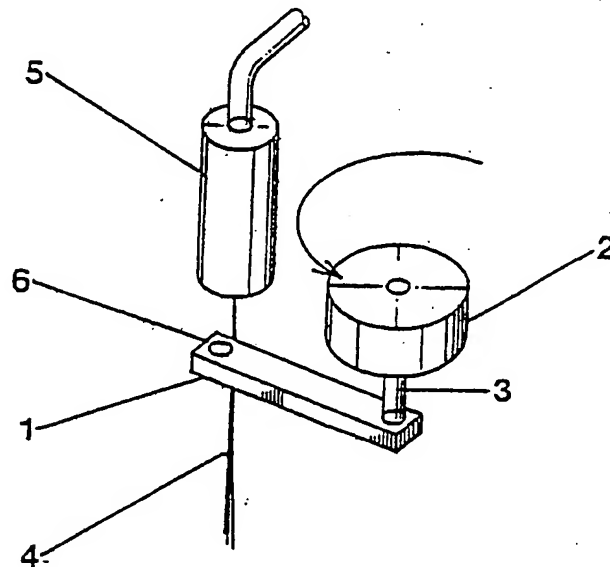
(75) Inventor/Applicant (for US only) : NIELSEN, Jens [DK/DK]; Nordre Fasanvej 257, DK-2200 København (DK).

(81) Designated States: CA, JP, NO, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published

With international search report.

(54) Title: POSITIONABLE PLATE USED AS A VALVE FOR CONTROLLING LIQUID-JET CUTTING



(57) Abstract

A valve for controlling liquid-jet cutting, especially of food products, such as fish fillets, comprises a plate (1) and a motor shaft (3) connected thereto. The plate is, by means of the motor (2), positionable in and removable from the path of the liquid jet (4) used in the cutting operation.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	MR	Mauritania
AU	Australia	GA	Gabon	MW	Malawi
BB	Barbados	GB	United Kingdom	NL	Netherlands
BE	Belgium	GN	Guinea	NO	Norway
BF	Burkina Faso	GR	Greece	NZ	New Zealand
BG	Bulgaria	HU	Hungary	PL	Poland
BJ	Benin	IE	Ireland	PT	Portugal
BR	Brazil	IT	Italy	RO	Romania
CA	Canada	JP	Japan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SK	Slovak Republic
CI	Côte d'Ivoire	LJ	Liechtenstein	SN	Senegal
CM	Cameroon	LK	Sri Lanka	SU	Soviet Union
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	MC	Monaco	TG	Togo
DE	Germany	MG	Madagascar	UA	Ukraine
DK	Denmark	ML	Mali	US	United States of America
ES	Spain	MN	Mongolia	VN	Viet Nam
FI	Finland				

POSITIONABLE PLATE USED AS A VALVE FOR CONTROLLING  
LIQUID-JET CUTTING

The present invention relates to a valve for liquid-jet cutting.

5        There exist several prior-art valves for controlling liquid-jet cutting of various products, especially food products such as fish fillets which are to be trimmed. A common disadvantage of such valves is the comparatively long reaction time for opening and closing, which is due  
10    to the valves being of flow-through type comprising a valve housing, a valve member, a valve seat, seals that should be able to withstand high pressures, as well as associated operating means. Further, the prior-art valves are relatively heavy, just because they include many  
15    components that should be able to withstand high pressures. Thus, the relatively high weight of the valves gives a fairly poor cutting capacity to the robot on which the valve is mounted and which serves to move the valve for performing a cutting operation e.g. for removing bones  
20    from fillets.

The object of the invention is to provide a valve for liquid-jet cutting which obviates the above inconveniences inherent in such valves.

According to the invention, this object is achieved  
25    by a valve which is characterised in that it comprises a plate and a motor shaft connected thereto, said plate being, by means of the motor, positionable in and removable from the path of the liquid jet used for the cutting operation, the motor being adapted to be fixed on  
30    a stand.

An embodiment of the invention will be described in more detail below with reference to the accompanying drawing, in which

Fig. 1 shows the valve in open position, and  
35    Fig. 2 shows the valve in closed position.

2

The illustrated valve consists of a bar-shaped plate 1 and an operating means for the plate, in this case a pneumatic rotary cylinder 2 whose shaft 3 is connected to one end of the plate 1. The rotary cylinder is fixedly  
5 mounted on a stand (not shown) so as to be able to pivot the other end of the plate 1 into the path of a liquid jet 4 sprayed from a nozzle 5 towards a product-cutting table or conveyor (not shown).

The motor is connected in conventional manner to  
10 means for controlling the motor or the robot in response to signals from a camera, a UV or IR detector or other detector monitoring the product to be cut on the table or the conveyor (see e.g. SE 8303327-4).

At the plate end hit by the liquid jet, there is  
15 provided an insert 6 made of some hard material, such as sapphire, for increasing the service life of the plate 1.

It will be appreciated that this arrangement enables the jet to be shut off and let through in a considerably shorter time than in conventional valves. The fact that  
20 the liquid jet is constantly on is of minor importance compared with the increase in cutting capacity. For comparative purposes, it may be mentioned that the opening and closing times of prior-art valves are about 0.8 s, while they can be reduced to about 0.2 s with the present  
25 invention.

It will be understood that patterns of movement other than a pivotal movement can be imparted to the plate. Thus, the plate may be translationally moved in its longitudinal direction to and from the jet by means of a  
30 piston-cylinder unit.

## CLAIMS

1. A valve for controlling liquid-jet cutting,  
5 c h a r a c t e r i s e d in that it comprises a plate  
(1) and a motor shaft (3) connected thereto, said plate  
being, by means of the motor (2), positionable in and  
removable from the path of the liquid jet (4) used for the  
cutting operation.
- 10 2. A valve as set forth in claim 1, c h a r a c -  
t e r i s e d in that the motor (2) is a rotary cylinder  
e.g. of pneumatic type.
3. A valve as set forth in claim 1 or 2, c h a -  
r a c t e r i s e d in that the impact area of the jet  
15 (4) on the plate (1) comprises an insert (6) made of a  
comparatively hard material, such as sapphire.

20

25

30

35

1/1

FIG.1

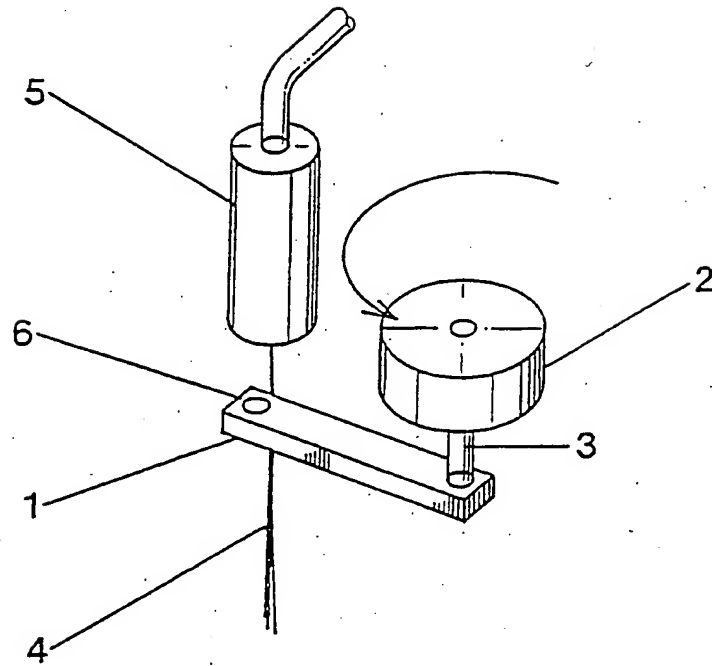


FIG.2

